Quantitative and Qualitative Assessments of Consensus Within Pharmacy's Academic Subdisciplines

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ABSTRACT. The purpose of this study was to measure the perceived level of agreement among pharmacy scholars within each of five academic subdisciplines on what constitutes good teaching and scholarship. An additional objective was to identify teaching and research priorities expressed by these same scholars. Surveys were mailed to a stratified random sample of faculty at 80 colleges and schools of pharmacy. Respondents compared their perceptions of intradepartmental agreement on what constitutes good teaching and scholarship with those of other departments in addition to ranking each subdiscipline on achieving its scientific paradigm. Respondents from all five subdisciplines perceived considerable agreement on what constitutes good teaching and scholar-

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ship. They also believed that the content in departmental course offerings was similar in colleges and schools of pharmacy throughout the U.S. Responses to open-ended questions identifying teaching and research priorities indicate a fairly well-defined focus by scholars in each subdiscipline on a core set of issues, although pharmaceutics, pharmacology, and medicinal chemistry may be slightly more mature. Opportunities for interdisciplinary research were identified. Rankings of perceptions of each subdiscipline's progress indicate that pharmacy practice and the social and administrative sciences may need to promote their research accomplishments to other pharmacy subdisciplines.

KEYWORDS. Intradisciplinary consensus, scientific progress, paradigm, interdisciplinary collaboration

INTRODUCTION

Scholars in the fields of education and sociology have devoted considerable attention to studying the structural composition of academic disciplines. Their early research efforts in the 1950s and 1960s involved observing disciplines' "progress" in achieving scientific breakthroughs. Initially, these studies yielded dichotomous characterizations of disciplines as either theoretical or empirical and mature or immature (1, 2). Kuhn's more comprehensive classification of disciplines, in which he posed a continuum of pre-paradigmatic versus paradigmatic scientific progress, was well received by scholars (3). This view of a discipline's progress considered whether it had achieved a consensus among its members in prioritizing the problems that required investigation, the appropriate methodologies by which to research these problems, and which tenets were widely agreed upon as proven or accepted by the majority. Biglan subsequently conferred greater objectivity on describing the structure and progress of disciplines using a multidimensional scaling procedure to identify the alignment of 36 disciplines on 3 dimensions: hard-soft, pure-applied, and life-non-life (4).

Accepting Kuhn's thesis of a discipline's progress by achieving consensus among its scholars and Biglan's description of the structure of disciplines, research in the 1970s through the 1990s took up the question of disciplinary differences as a control variable in studies of organi-

zational phenomena. Of interest to researchers has been the effect of disciplinary difference on scholarly reward and stratification systems, social control or policing of professional behavior, departmental effectiveness, attitudes or beliefs about the university, and even political beliefs (5-9). While it is beyond the scope of this paper to provide a comprehensive review of organizational phenomena relating to disciplinary structure, there is merit in at least briefly describing relationships between disciplinary consensus and events/constructs related to research and teaching.

DISCIPLINARY CONSENSUS AND RESEARCH

Evidence suggests that scholars in high-consensus disciplines prefer committing more of their time to research activities than those in low-consensus disciplines (9). This may be due to the prevailing conditions in low-consensus disciplines that make accomplishment in the research arena more difficult. As basic tenets in low-consensus disciplines have not been unequivocally adopted, scholars may have to spend inordinate amounts of time continuously testing and retesting various assumptions rather than spending this time pursuing novel research interests. Communication among scholars in low-consensus disciplines may be more arduous than among those in high-consensus disciplines. This is evidenced by doctoral dissertations in low-consensus disciplines being greater in length and by there being a greater amount of space in their scholarly communications dedicated to establishing the literature (10, 11). Having a greater difficulty in convincing reviewers of the merits of the study, scholars in low-consensus disciplines face a higher rejection rate for manuscripts submitted to peer review (12). Additionally, researchers have found a significantly greater likelihood of particularism prevalent among fields with less highly developed paradigms (13). In other words, editorial board member selection and publication decisions were based more on particularistic criteria such as social connections, institution, gender, and race rather than universalistic or meritorious criteria.

Similarly, Hargens examined the association between time spent on research and publication productivity in the areas of chemistry (a high-consensus discipline) and political science (a low-consensus discipline). As expected, he found a larger correlation between these two variables in chemistry than in political science (14). Hargens and Kelly-Wilson subsequently found that anomie exerted strong effects of scholarly pessimism within fields and that disciplinary discontent, or

feelings that one's field is stagnant, is attributable largely to dissensus among scholars in that field rather than to individual characteristics of the scholar (15).

The implications of variation among disciplines extend even into the success rates for obtaining departmental funds and resources. As would be expected, scholars in high-consensus disciplines were shown to be more successful at obtaining extramural funds; however, even after controlling for the additional overhead garnered from attainment of such funds, Lodahl and Gordon found that universities disproportionately awarded more assets and internal funds to high-consensus disciplines (16).

Disciplinary Consensus and Teaching

The level of consensus within a discipline affects teaching goals and strategies. In general, it has been shown that faculty in low-consensus fields place greater emphasis on student growth needs (17). Faculty in low-consensus fields give greater importance to providing a broad general educational experience than faculty in high-consensus fields, who in turn give greater importance to career preparation (18). Faculty in low-consensus disciplines are less likely to use teaching assistants and less likely to do collaborative teaching but more likely to use a "discursive" approach to their teaching, that is, they are more likely to discuss points of view other than their own and to relate course topics to other fields of study (17). These faculty are more likely to ask examination questions involving synthesis and analysis and to assign journal articles as required readings (19, 20).

Student evaluations of teaching performance commonly involve assessments of the instructor, the course, and the cognitive content of the course (21). On all three dimensions, courses in high-consensus fields tend to receive lower ratings than courses in low-consensus fields (22). Researchers have debated whether "complementarity" exists between teaching and research roles, with some arguing that the two roles are reinforcing, while others argue that they are in conflict (23). Feldman found that teaching and research performance have a moderate (r = 0.21) relationship in low-consensus fields but an insignificant relationship (r = 0.05) in high-consensus fields (24).

Disciplinary Progress in Pharmacy Education and Research

Kuhn's and Biglan's characterizations of disciplines included basic areas of study such as physics, sociology, chemistry, and the humanities

(3, 4). Little has been done to assess consensus or progress toward achieving scientific progress within academic subdisciplines of professional fields, such as nursing, medicine, law, and pharmacy. A recent study of five academic subdisciplines of pharmacy indicated at least modest perceptions of consensus by scholars within each of their respective areas on issues such as course sequencing, teaching strategies, scholarly communications, the use of graduate teaching assistants, and departmental decision making (25). While this was an important first step toward assessing the progress of these subdisciplines toward consensus, it measured only perceptions of consensus. Further, the referents for comparison by subjects in assessing these perceptions were fellow department members in the same institution and not all members of the subdisciplines throughout U.S. colleges and schools of pharmacy.

By nature, pharmacy's academic subdisciplines (henceforth, "subdisciplines") are newer and tend to borrow from older, more established disciplines. They may not have fully established their own scientific paradigms, thus failing to have developed a consensus within their own ranks on key issues such as the most appropriate course content for entry-level students and the most important issues/problems to research. Evidence would suggest that pharmacy practice and the social and administrative sciences (SAdS) may lag even further behind other pharmacy disciplines.

Pharmaceutical education from the 1940s to the 1970s has been dubbed "the science era" (26). Following the industrialization of pharmacy manufacturers into mass producers of prefabricated drug products, pharmacy education transitioned to a greater use of "theoretically organized scientific paradigms" (26). Medicinal chemistry first evolved from descriptive pharmaceutical chemistry. Next came pharmacology, primarily born as a basis for organizing instruction in other courses (27). This was followed by a marriage of pharmacy and physical chemistry into pharmaceutics. Pharmacy administration and disciplines associated with practice actually faded during this period. Moreover, the SAdS borrow from disciplines like psychology, anthropology, economics, and marketing, disciplines already demonstrated to be "softer" or less structured in nature than basic sciences (28). Graduate education in the area of pharmacy practice barely existed in the 1960s and did not become pervasive until the 1990s.

It is critical to proceed further in measuring levels of consensus on teaching and research issues within pharmacy's academic subdisciplines for several reasons. With respect to teaching, it has been sug-

gested that pharmacy propel its paradigm further into the mainstream of current and future national health care priorities and that this must begin with a basic agreement among scholars in pharmacy academia on teaching and research issues (29). It has also been argued that to make interdisciplinary professional pharmacy curricula more viable, there must be agreement on domains or content areas that must be mastered by students (30). This argument was supported empirically in a study outside of pharmacy. Specifically, Salancik, Staw, and Pondy found that the conflict arising from task interdependence associated with intra- and interdepartmental collaboration was mitigated by consensus within departments on the coordination of tasks (31). With respect to research, if academic subdisciplines of pharmacy are to compete with other allied health professions, medicine, and basic scientists for extramural funds and to compete for internal resources within the university, it behooves scholars in these areas to have an agenda upon which priorities for research have been established and agreed upon.

STUDY PURPOSE

The purpose of this study was to assess the existence of a consensus on teaching and research issues within each of five subdisciplines of pharmacy (medicinal chemistry, pharmaceutics, pharmacology, pharmacy practice, and social and administrative sciences). The specific objectives were to:

1. Compare rankings of the five subdiscipline's progress toward achieving their scientific paradigms as perceived by pharmacy academicians
2. Identify factors associated with perceptions of intradepartmental agreement on what constitutes good scholarship and teaching
3. Assess qualitatively the concepts/issues that subdiscipline members believe to be the most important for their scholars to teach to entry-level students
4. Assess qualitatively the issues/problems that subdiscipline members believe to be the most important for their scholars to focus upon in their research
5. Compare the qualitative responses to gauge each subdiscipline's level of consensus among its members and to identify subject areas for potential interdisciplinary collaboration.

METHODS

Study Design and Sampling

Surveys were mailed to a random sample of faculty employed on a full-time basis at U.S. colleges and schools of pharmacy stratified by disciplines during the summer of 2000. A list of all faculty members at accredited U.S. schools and colleges of pharmacy was obtained from the American Association of Colleges of Pharmacy (AACP) Roster of Faculty and Professional Staff 1999-2000 (32). The roster provides the name, address, and discipline of each faculty member. The AACP roster identifies each faculty member as belonging to one of several disciplines: medicinal/pharmaceutical chemistry/pharmacognosy (henceforth referred to as medicinal chemistry), pharmaceutics, pharmacology, pharmacy practice, and social and administrative sciences (henceforth referred to as SAdS). Other categories include continuing professional education, libraries/educational resources, and biological sciences; however, this study was not concerned with these disciplines. After assigning a unique number to each faculty member listed by discipline, subjects were chosen with a random number-generating procedure. Thirty percent (162) of medicinal chemistry, 30% (152) of pharmaceutics, 30% (142) of pharmacology, 12% (221) of pharmacy practice, and 40% (138) of SAdS faculty were sampled. Pharmacy practice faculty were specifically undersampled and SAdS faculty oversampled due to the vast differences in the number of faculty members comprising these disciplines. The total number of questionnaires mailed was 815. A reminder postcard was mailed to the sampled population approximately ten days after the initial questionnaire mailing in an effort to increase the response rate.

Questionnaire Development

A copy of the survey instrument (modified due to margins, typesetting, etc.) is provided in the Appendix. The survey was comprised of several components. The first was designed to obtain respondent's perceptions of the levels of agreement within their own departments on specific issues concerning teaching strategies, research methods, organizational decision making, and scholarly rewards, the results of which have been reported previously (25). The first of the remaining components concerning this study employed a series of three forced-choice questions comparing subjects' perceptions of the level of agreement

within their academic department on what constitutes "good" teaching and scholarship in comparison to that of *other* pharmacy departments in the same institution. While the use of one item each to gauge consensus may not appear to be psychometrically sound, this method was similarly employed by Lodahl and Gordon and was shown to exhibit predictive validity in identifying disciplines in their development of a scientific paradigm (33). For analysis purposes, the answer "much less" was coded as 1, "somewhat less" as 2, "about the same" as 3, "somewhat more" as 4, and "much more" as 5. Respondents were also asked to indicate how their department's entry-level degree program (ELDP) course offerings differ from those of other schools of pharmacy. Similarly, "very much" was coded as 1, "somewhat" as 2, "very little" as 3, and "not at all" as 4. On the next portion of the survey, respondents were asked to indicate the maximum chain length of courses offered by their department strung together by prerequisites in the ELDP. Course chain length has been documented as an accurate predictor of scientific paradigm development (34). They were then asked to rank the five subdisciplines under study according to how well their scientific paradigms were structured. Operational definitions of *maximum chain length* and *scientific paradigm* were provided in the questionnaire. Next, subjects were asked to respond to two open-ended questions. The first asked them to list, in no particular order, the six most important issues/problems that should be researched by scholars in their discipline. Subjects were asked to think in terms of both promoting patient/societal welfare and advancing their discipline when identifying these issues. They were provided further instruction and discipline-specific examples to indicate the desired generality/specificity of answers sought. Subjects were given similar instructions to provide six concepts/issues that should be taught by scholars in their discipline to ELDP students. The final part of the questionnaire solicited demographic information and other data regarding the respective institutions employing respondents.

Analysis

Data were recorded in SPSS 10.0-PC® for analysis (35). Descriptive statistics were tabulated for answers to the quantitative questions, the maximum chain length of courses, and the rankings of the disciplines' progress toward achieving their scientific paradigms. The significance in magnitude of the rankings was determined initially by applying a Kendall's test of concordance. Subsequent post hoc pairwise comparisons of the differences in the rankings were confirmed with a series of

Wilcoxon signed ranks tests. The effect of the respondent's discipline on the rankings afforded to each of the five subdisciplines was determined with the use of five Kruskal-Wallis one-way analyses of variance tests with the mean ranks acting as the dependent variable and the respondent's discipline acting as the independent variable.

The second study objective was accomplished with the use of three general linear models analysis of variance (GLM ANOVA) procedures. Responses to questions soliciting opinions on intradepartmental agreement on "good" teaching and scholarship and the reported maximum chain length of courses served as dependent variables, while the respondent's discipline, institution, gender, and race were employed as independent variables. First, all three-way and two-way interactions were assessed. This was followed by an analysis of the main effects only.

An investigator from each discipline recorded the answers to the open-ended questions from respondents in their respective disciplines. The investigator then created frequency matrices of principle categories and subcategories following a thorough examination of the answers provided to each question. The investigators then made comparisons between the answers provided by respondents from each subdiscipline on the basis of how focused their answers were on core sets of issues. There was also an attempt to identify topic areas that were common to more than one discipline, thus identifying issues/problems ripe for interdisciplinary collaboration.

RESULTS

Descriptive Statistics

Of the 815 surveys mailed, 16 were returned as undeliverable. Additionally, the principal investigator received a total of six phone calls and e-mail messages from subjects or clerical staff of institutions stating that the faculty member had left, had retired, was on sabbatical, or otherwise could not return the survey. One hundred eighty-seven surveys with usable data were returned, yielding a total response rate of 23.6%. Of the 187 subjects who mailed in responses, 127 (67.9%) provided answers to the open-ended question on research issues, while 133 (71.1%) did so for the question on teaching issues.

Table 1 provides descriptive data of the respondents and their respective institutions. The response rates for both the objective and qualitative components of the questionnaire from subjects across each discipline

TABLE 1. Descriptive Data of Respondents and Their Employing Academic Institutions.

Characteristic	*n*[a]	%[b]	Return Rate[c]
Discipline			
Medicinal Chemistry	31	16.8	19.1
Pharmaceutics	28	15.1	18.4
Pharmacology	36	19.5	25.4
SAdS	38	20.5	23.5
Pharmacy Practice	52	28.1	27.5
Rank			
Instructor	1	0.5	
Assistant professor	58	31.0	
Associate professor	66	35.3	
Professor	62	33.2	
Institution[d]			
Primarily teaching	20	10.7	
Primarily research	52	27.8	
Equal balance of teaching and research	115	61.5	
Gender			
Male	130	71.0	
Female	53	29.0	
Race/Ethnicity			
Caucasian	148	82.7	
African-American	8	4.5	
Hispanic/Latino	4	2.2	
Asian/Pacific Islander	13	7.3	
Native of India	4	2.2	
Other[e]	2	1.1	

[a]Any total under 187 is indicative of missing data.
[b]Total may not add up to 100.0 due to rounding.
[c]Rates of return are provided by respondent's discipline only.
[d]From self-report by subjects in response to the closed-ended question, "How would you classify your institution?"
[e]Respondents were not asked to specify further.

were similar, ranging from 18.4% (pharmaceutics) to 27.5% (SAdS). The proportion of respondents by gender and by race/ethnicity would appear to be similar to the population of pharmacy academicians in the United States. Over 60% of the respondents indicated that their institution was balanced in teaching and research, with just over one-fourth of them identifying their institution as primarily research oriented and just

over 10% indicating their institution is primarily teaching oriented in its mission. There was an approximately equal distribution of respondents from the assistant, associate, and full professor academic ranks. On average, respondents were 46.87 years of age, had been employed 14.49 years as full-time faculty members, and had been at their current rank for 8.33 years.

The authors employed two approaches to determine the potential for nonresponse bias. This involved the analysis of respondents who returned a usable survey but did not necessarily answer the qualitative questions in full. A wave analysis of the first 20 and last 20 respondents determined that they did not differ by discipline, type of institution, rank, or gender, but did differ by the proportion of nonwhite respondents, with a significantly greater proportion of nonwhite respondents comprising the late responder group (36). The proportion of respondents by gender and race/ethnicity was also compared with those of the entire U.S. pharmacy faculty as reported in the *AACP Institutional Report Series 1999-2000 Profile of Pharmacy Faculty* (37). The proportion of male respondents in this study did not differ significantly from the proportion of male pharmacy faculty in the U.S. (64.7%), nor did the proportion of Caucasian respondents in this study differ significantly from the proportion of Caucasian pharmacy faculty in the U.S. (80.3%).

Quantitative Analyses

Table 2 provides the mean responses to the quantitative questions. The distribution of answers and the mean responses to the comparative questions were very similar across the subdisciplines. Only on what respondents considered "good" scholarship was there any appearance of a difference between the subdisciplines, as pharmacy practice scholars perceived somewhat less agreement among themselves compared to that of other respondents. Interestingly, the mean response to each question exceeded the median scale value. In other words, respondents from each subdiscipline perceived greater agreement within their department than the level of agreement in other departments. The means calculated for the maximum chain length of courses were similar and ranged from 2.68 (SAdS) to 3.23 (medicinal chemistry).

The GLM ANOVA procedures on perceptions of intradepartmental agreement on good teaching and on maximum course chain length failed to identify any significant interaction terms or main effects. The adjusted coefficients of determination (r^2) for the two procedures were 0.01 and 0.04, respectively. For the procedure on intradepartmental

TABLE 2. Responses to the Comparative Survey Questions by Discipline.

Question	Mean	S.D.
How do you perceive the level of agreement on teaching (what to teach, what is "good" teaching) in your department compared to other pharmacy departments at your institution?[a]		
Medicinal Chemistry	3.34	0.77
Pharmaceutics	3.57	1.20
Pharmacology	3.42	0.97
Pharmacy Practice	3.43	0.96
SAdS	3.71	0.93
How do you perceive the level of agreement on scholarship (what and how much qualifies as "good" scholarship) in your department compared to other pharmacy departments at your institution?[a]		
Medicinal Chemistry	3.52	0.99
Pharmaceutics	3.32	1.06
Pharmacology	3.40	1.22
Pharmacy Practice	2.92	0.97
SAdS	3.37	1.02
How much does the content in your departments' ELDP course offerings differ from those of other schools of pharmacy?[b]		
Medicinal Chemistry	2.68	0.67
Pharmaceutics	2.62	0.57
Pharmacology	2.76	0.75
Pharmacy Practice	2.76	0.56
SAdS	2.75	0.60
What is the maximum chain length of courses for the ELDP offered by your department strung together by prerequisites?		
Medicinal Chemistry	3.23	1.53
Pharmaceutics	2.85	1.08
Pharmacology	3.22	1.45
Pharmacy Practice	3.49	1.39
SAdS	2.68	1.36

[a]Response format is a 5-point scale where 1 = "much less," 2 = "somewhat less," 3 = "about the same," 4 = "somewhat more," and 5 = "much more."
[b]Response format is a 4-point scale where 1 = "very much," 2 = "somewhat," 3 = "very little," and 4 = "not at all."

agreement on good scholarship, there were no significant interaction terms. A main effects only model achieved significance ($F = 1.991$, df = 13/156, $p = 0.025$) and identified one variable contributing toward the explanation of variance, which was the respondent's type of institution where employed ($F = 4.22$, df = 2, $p = 0.019$). A post hoc Tukey's test indicated higher levels of agreement perceived by respondents from

universities/colleges balanced in their mission ($\mu = 2.91$) over those from universities/colleges whose mission is primarily teaching in nature ($\mu = 3.78$). Still, the adjusted r^2 was only 0.07.

The mean rankings afforded to the disciplines in achieving their scientific paradigms, from highest to lowest rank, were: medicinal chemistry (2.19), pharmacology (2.21), pharmaceutics (2.44), SAdS (3.95), and pharmacy practice (3.96). Kendall's test of concordance indicated a significant difference in the mean rankings (chi-square statistic = 235.29, df = 4, $p < 0.001$). Post hoc Wilcoxon signed rank tests confirmed a significant difference in the mean rankings between both pharmacy practice and SAdS with the other three subdisciplines and between medicinal chemistry and pharmaceutics.

Table 3 provides the results of the five Kruskal-Wallis one-way ANOVAs in which the perceptions of each discipline's development of a scientific paradigm are broken down according to the respondent's disciplines. Kruskal-Wallis provides critical mean ranks attained from the rankings of *all* respondents in total. The rankings in the table are based on the 187 respondents' choices and not the numbered ranks themselves. Thus, mean ranks range from the 60s to 100s rather than from 1 to 5, and the lower the critical mean rank, the higher the ranking. The ANOVAs for medicinal chemistry, pharmaceutics, pharmacology, and pharmacy practice were all significant. This means that a significant difference exists among respondents of various disciplines in how they ranked the discipline in question. Nonparametric Kruskal-Wallis procedures preclude the use of post hoc testing, so there can only be a general finding of significance and no further analysis of groupings. Medicinal chemistry was ranked highest by SAdS members and lowest by pharmacologists. (Note: This does not mean that pharmacologists ranked medicinal chemistry lower than they did other disciplines, but rather that they did not rank medicinal chemistry as highly as did respondents from other disciplines.) Pharmaceutics and pharmacology were both ranked highest by their own members. Pharmaceutic's lowest rankings were afforded by SAdS members, while pharmacology's lowest rankings were afforded by medicinal chemists. Pharmacy practice respondents ranked their own discipline higher than did other respondents, especially the social and administrative scientists. The rankings afforded to the SAdS did not differ by respondents' disciplines.

Qualitative Results

Tables 4 through 8 provide the responses and corresponding frequencies to the open-ended questions soliciting opinions of teaching and re-

TABLE 3. Results of the Kruskal-Wallis ANOVAs of Subdiscipline Mean Rankings by Respondents of the Various Subdisciplines.

Discipline in Question	Respondent's Discipline	Critical Mean Rank[a]	Chi-Square[b]	*P*-value
Medicinal Chemistry			10.54	0.032
	Medicinal Chemistry	74.69		
	Pharmaceutics	85.44		
	Pharmacology	102.19		
	Pharmacy Practice	92.59		
	SAdS	69.73		
Pharmaceutics			8.61	0.070
	Medicinal Chemistry	86.83		
	Pharmaceutics	62.81		
	Pharmacology	94.23		
	Pharmacy Practice	85.14		
	SAdS	94.40		
Pharmacology			29.52	0.000
	Medicinal Chemistry	108.57		
	Pharmaceutics	89.48		
	Pharmacology	48.82		
	Pharmacy Practice	95.64		
	SAdS	93.31		
Pharmacy Practice			12.50	0.014
	Medicinal Chemistry	89.22		
	Pharmaceutics	88.07		
	Pharmacology	83.29		
	Pharmacy Practice	71.10		
	SAdS	107.17		
SAdS			4.89	0.299
	Medicinal Chemistry	79.88		
	Pharmaceutics	94.02		
	Pharmacology	88.20		
	Pharmacy Practice	92.76		
	SAdS	73.60		

[a]Lower numbers are indicative of a higher or "better" mean ranking.
[b]Degrees of freedom = 4 for each test.

search priorities by members of each subdiscipline. Medicinal chemistry respondents (Table 4) converged most frequently upon the issues of specific therapeutic targets, drug design, absorption/distribution/metabolism/excretion (ADME), and mechanisms (of action and toxicity) as research priorities for the discipline. Aside from identifying a number of specific courses, their opinions of teaching priorities focused upon structure-activity relationships (SARs), ADME, the chemical as-

TABLE 4. Problems/Issues/Concepts Identified by Medicinal Chemistry Respondents for Members of Their Discipline to Research and Teach.

Research Problems/Issues (n = 23)	Response Frequency
1. Specific therapeutic/research targets	24
2. Drug design/lead identification/optimization of lead compounds/characterization of drug targets	20
3. Absorption/distribution/metabolism/excretion and other pharmacokinetic areas	11
4. Mechanisms (e.g., drug action, toxicity)	10
5. Genomics/gene therapy	8
6. Development/improvement of analytical methodologies/ instrumentation	8
7. General research topics (e.g., immunotherapy, natural products chemistry, plant physiology, informatics, drug resistance)	8
8. Medicinal chemistry educational research	7
9. Pharmacy practice issues (e.g., assessing value of new biotech modalities to pharmacists, the role of the pharmacist in future practice, rational selection of drug products)	6
10. Synthesis of new chemical entities	4
11. Peptides (increase use in therapy/delivery of peptides)	3
12. Combinatorial chemistry	3
13. High throughput screening	3
14. Drug toxicity	2
15. Drug interactions	2
Teaching Issues/Concepts (n = 24)	
1. Structure-activity relationships	13
2. Absorption/distribution/metabolism/excretion	13
3. Specific courses/disciplines (11)	
Biochemistry	2
Foundation in basic sciences	2
Pharmacology of major drug classes	2
Basic pharmacokinetic principles	1
Clinical chemistry	1
Immunology	1
Molecular pharmacology	1
Pharmacognosy	1
4. Specific therapeutic topics (9)	
Chemotherapeutic agents	3
Diagnostic tests/imaging	2
Endocrine drugs	2
Nutritional theory	1
Use of drugs in pediatric patients	1
5. Biotechnology (including genomics)	8
6. Natural products, herbal medicines, and nutraceutics	6
7. Acid/Base chemistry	5
8. Functional group chemistry	5
9. Mechanisms (of drug action, reactions, and enzymes)	5

TABLE 4 (continued)

10.	Chemical, physiochemical, pharmacological, and biological aspects for diagnosis and treatment of disease states	5
11.	Receptor theory/drug interactions with receptors/dose response	4
12.	Drug solubility	4
13.	Importance of chemical/physiochemical properties	4
14.	Drug discovery, design, and development	4
15.	Analytical chemistry	4
16.	Problem-solving skills	3
17.	Drug interactions	2
18.	Stereochemistry	2
19.	Other (including chemistry and biochemistry of prototype drugs, potency of noteworthy drugs, effect of peptide structure on drug action of peptides, and anticipation of new directions in drug therapy)	4

pects of specific therapeutic topics, biotechnology, and natural products. Pharmaceutics respondents (Table 5) overwhelmingly cited drug delivery systems and pharmacokinetics issues as priorities for research but also cited natural products and stability issues. They also cited drug delivery systems and system development and pharmacokinetic principles, in addition to extemporaneous compounding and stability issues, as key concepts that should be taught to students by members of their discipline. The responses to the research priorities question by pharmacology respondents (Table 6) were more widely distributed but, nonetheless, focused upon specific classes of therapeutic agents, pharmacogenomics, cell signaling, neuropharmacology, and complementary medicine. Meanwhile, they cited specific classes of agents or disciplines, adverse drug reactions (ADRs), mechanisms of action (MOAs), complementary medicine, pathophysiology, therapeutics, and receptor pharmacology as topics that should be taught to ELDP students by members of their discipline. Pharmacy practice respondents (Table 7) focused on obtaining reimbursement for pharmacists providing pharmaceutical care, patient outcomes to taking alternative medicine, outcomes assessment, disease state management, and education research (methods to encourage lifelong learning) as research priorities for members of their discipline. The key concepts they identified for teaching in the ELDP were disease state management, patient counseling, problem-solving skills, patient assessment, and clinical pharmacokinetics. The responses provided by SAdS members (Table 8) to the research problems question covered a broad range of interrelated topics, but by far the most frequently cited issue was assessing the role of the

TABLE 5. Problems/Issues/Concepts Identified by Pharmaceutics Respondents for Members of Their Discipline to Research and Teach.

Research Problems/Issues (n = 20)	Response Frequency
1. Drug delivery systems/drug targeting (for specific drug therapies, new mechanisms, improving existing mechanisms)	29
2. Pharmacokinetics/pharmacodynamics/biopharmaceutics (drug absorption, metabolism, transport, cellular uptake and transport)	20
3. Delivery systems for proteins and peptides (transport and stability issues)	8
4. Delivery systems for gene therapy	7
5. Natural or herbal products (determining active ingredients, improved formulations, kinetics and bioequivalence issues)	6
6. Drug stability issues (stability testing, polymorphism, stability parenteral admixtures)	5
7. Formulation studies (characterization and functioning of excipients, transport phenomena in semisolids, scale-up, novel polymer carriers)	5
8. Analytical approach	2
9. Extemporaneous compounding	2
10. Other (12)	
Absorption enhancers for oral route	1
Antimicrobial resistance patterns	1
Drug residue in animals	1
Elucidation of molecular basis for disease	1
Genotyping in clinical studies	1
Identification of molecular targets for problematic diseases	1
Immunology applied to pharmaceutics	1
Molecular basis for disease and drug metabolism	1
P-GP expression	1
Pharmacogenomics as it relates to drug therapy	1
Rational drug design	1
Rationalization of high throughput screening techniques	1
Teaching Issues/Concepts (n = 20)	
1. Drug delivery systems (controlled drug delivery, DDS design, novel systems, drug release, delivery of biotechnology drug products, colloidal delivery systems)	17
2. Drug delivery system development and innovation (physical/chemical properties of drugs, drug targeting, diffusion and dissolution behavior, pharmacogenomic aspects)	16
3. Pharmacokinetics (multiple dose regimens, nonlinear kinetics, chemical kinetics, drug disposition)	16
4. Biopharmaceutics (inter-relationship among transport phenomena, formulation variations, new methods development for drug transport and uptake)	10
5. Compounding extemporaneous drug delivery systems	9
6. Stability issues for drugs and delivery systems	8

TABLE 5 (continued)

7.	Pharmacodynamics	7
8.	Dissolution testing	6
9.	Medicinal chemistry issues (acid/base concepts, rational drug design, physical chemistry, structure-activity relationships)	5
10.	Pharmaceutical calculations	4
11.	Regulatory issues (CGMP, validation)	2
12.	Other (10)	
	Communication skills for dispensing medication	2
	Ionic equilibrium processes	2
	Cosmetology (principles and applications of)	1
	Cost of drug therapy	1
	Critical thinking skills	1
	Herbal compounding	1
	How patients should use drug delivery systems	1
	Pharmaceutics (general)	1

pharmacist and pharmacist's interventions in modern health care delivery, followed by pharmacoeconomic evaluations of specific drug regimens, manpower issues, behavioral aspects of care, and policy issues. They indicated various aspects of management as principle topics that should be addressed by them in their respective ELDPs, in addition to communication, health care systems, pharmacoeconomics, and marketing.

As previously mentioned, the categorization of responses from members of each subdiscipline was performed by an expert in that respective field. Five different individuals performed the categorizations, thus making comparisons across the subdisciplines difficult. Nonetheless, some general observations are worth noting. With the exception of pharmacy practice, recurring responses totaling in the 20s in frequency occurred in response to the identification of research, rather than teaching, priorities. With that caveat, the range of responses to the research question was broader than the range of responses to the teaching question, as there were many singularly occurring responses to the research question.

Overall, considering the open-ended nature of the questions, the responses provided by members of all five disciplines were at least somewhat focused. In many cases, approximately 30 respondents provided a total of 150 to 180 individual priorities for research and teaching. The fact that their responses could be grouped reasonably into 15 to 20 major categories is indicative of at least a modest level of consensus among members of each subdiscipline in question.

TABLE 6. Problems/Issues/Concepts Identified by Pharmacology Respondents for Members of Their Discipline to Research and Teach.

Research Problems/Issues (n = 24)	Response Frequency
1. Specific agents/disciplines	24
Neuropharmacology	7
Developmental pharmacology	4
Antineoplastic agents	3
Immunopharmacology	3
Anti-infective agents	2
Antiobesity agents	1
2. Pharmacogenomics	9
3. Cell signaling	7
4. Pharmacology of proteins	7
5. Issues in complementary/alternative medicine	6
6. Cellular physiology/molecular biology	5
7. Adverse drug reactions	4
8. Gene therapy	4
9. Mechanisms of drug action	4
10. Age and gender issues	3
11. Issues in drug abuse	3
12. Medical ethics	3
13. Drug interactions	2
14. Pharmacodynamics	2
15. Research methods in pharmacology	2
16. Transport proteins/mechanisms	2
17. Patient compliance issues	1
18. Long-term effectiveness of therapies	1
19. Other	5
Formulation and testing of cosmetics	1
Perceptions of scientists by society	1
Insurance companies' coverage of various disease states	1
Miscellaneous	2
Teaching Issues/Concepts (n = 23)	
1. Specific agents/disciplines	27
Neuropharmacology	7
Anti-infective agents	4
Antineoplastic agents	3
Cardiovascular/pulmonary pharmacology	3
Endocrine pharmacology	3
Immunopharmacology	3
Autonomic pharmacology	2
Analgesic agents	1
Developmental pharmacology	1
2. Adverse drug reactions	9
3. Mechanisms of drug action	9
4. Complementary/alternative medicine (issues in)	6
5. Physiologic/pathophysiologic issues/concepts	6
6. Receptor pharmacology	6
7. Therapeutic issues/concepts	6

TABLE 6 (continued)

8.	Drug abuse (issues in)	5
9.	Pharmacodynamic issues/concepts	5
10.	Pharmacokinetic issues/concepts	5
11.	Gene therapy	4
12.	Learning/study skills	4
13.	Calculations/statistics	3
14.	Pharmacogenomics	3
15.	Problem-solving/critical thinking skills	3
16.	Structure-activity relationships	3
17.	Pharmacology of new drugs	2
18.	Cell signaling	1
19.	Cellular physiology/molecular biology	1
20.	Laboratory experiences	1
21.	Pharmacoepidemiology	1
22.	Other	3

There appeared to be a greater congruence between teaching and research priorities *within* the disciplines of medicinal chemistry, pharmaceutics, and pharmacology. This was especially true for pharmaceutics and pharmacology. Drug delivery systems, drug targeting, genomics, and stability issues were high teaching and research priorities for pharmaceutics respondents. Pharmacologists typically listed specific agents or classes of drugs concomitantly in identifying research and teaching priorities. Many topics are listed with nearly the exact same frequencies in the teaching and research components of Table 6. Medicinal chemists' priorities centered upon certain major categories of drugs, structure-activity relationships, and genomics/biotechnology issues for both teaching and research priorities. On the other hand, pharmacy practice respondents, who fell short of unifying on any major research issues, cited disease state management, medicine topics, and patient counseling as teaching priorities. SAdS respondents, who frequently cited investigating the role of the pharmacist as a research priority, most frequently reported management and communication as teaching priorities. Moreover, while these respondents provided rather specific answers to the research questions, their answers to the open-ended "teaching" question were far more broad (e.g., "management" and "marketing").

LIMITATIONS

The results of this study should be interpreted with some caution. First, responses were obtained from less than 30% of faculty who were

TABLE 7. Problems/Issues/Concepts Identified by Pharmacy Practice Respondents by Members of Their Discipline to Research and Teach.

Research Problems/Issues (n = 31)	Response Frequency
1. Reimbursement for pharmaceutical care	9
2. Efficacy/safety/outcomes of herbal medicine/alternative medicine	7
3. Methods for encouraging lifelong learning	6
4. Outcome assessment	6
5. Pharmaceutical care/disease state management	6
6. Compliance issues	5
7. Minimizing adverse events/prevention of ADRs	5
8. Benchmarking (best methods)	3
9. Biological basis of variability in drug response	3
10. Impact of pharmacists in community pharmacy	3
11. Patient satisfaction of pharmacy services	3
12. Assessing learning outcomes of patients following pharmacy-based patient education to develop tools for specific learning needs	2
13. Clinical drug trials	2
14. Collaborative practice models	2
15. Cost-effectiveness in pharmaceutical care models "pharmacoeconomics"	2
16. Ethics in pharmacy practice and management	2
17. Managing of medication errors	2
18. Measuring of levels of student performance in experiential training	2
Teaching Issues/Concepts (n = 36)	
1. Pharmacotherapeutics/disease state management	25
2. Specific medicine topics	16
Cardiovascular disorders	2
Endocrine disorders	2
Infectious diseases	2
Nephrology disorders	2
Anticoagulation	1
Critical care	1
Dermatology	1
Internal medicine	1
Oncology	1
Pediatrics	1
Psychiatry	1
Pulmonary disorders	1
3. Communication/patient counseling	15
4. Lifelong learning/problem-solving/critical thinking skills	13
5. Patient assessment	11
6. Clinical pharmacokinetics	9
7. Medical informatics/drug information	6
8. Pharmaceutical care	6
9. Critical evaluation of the literature	5
10. Drug interactions	5

TABLE 7 (continued)

11.	Ethics	5
12.	Community pharmacy (pharmacist involvement in)	4
13.	Over-the-counter medications/herbal products	4
14.	ADRs	3
15.	Documentation of pharmacist care interventions	3
16.	Law	3
17.	Pathophysiology	3
18.	Nutrition	2
19.	Pharmacoeconomics	2
20.	Pharmacology	2
21.	Professionalism	2
22.	Reimbursement for patient care/cognitive services	2

mailed a questionnaire, and thus results were obtained from approximately 50 or fewer faculty from each discipline. While responses were received from nearly all of the 80 colleges and schools of pharmacy in total, responses from each subdiscipline were obtained from only 20-40 colleges and schools of pharmacy. This limits the generalizability of the results to the entire body of pharmacy faculties throughout the United States. Another limitation was that some of the questions requested that subjects make comparisons between their respective departments and other departments and make judgments about other disciplines' development of scientific paradigms. The subject is without complete knowledge of the phenomena he or she is being asked to judge. Differing organizational structures among colleges and schools of pharmacy may make this even more difficult. For example, many colleges and schools of pharmacy have gone to a division rather than a department structure. Some programs are associated with medical schools where pharmacology is taught by members of the medical pharmacology department. Their rankings of scientific paradigm development may have been based upon limited interactions with colleagues at their respective institutions. Finally, the subjects' particular teaching and research interests could have biased their answers to the open-ended questions.

DISCUSSION

It has been argued that expectations of performance and stress levels among college faculty are up, while morale may be down (38). The case of pharmacy educators may be more problematic, as the entire profession has embraced new practice philosophies and most colleges and

TABLE 8. Problems/Issues/Concepts Identified by SAdS Respondents by Members of Their Discipline to Research and Teach.

Research Problems/Issues (n = 28)	Response Frequency
1. Impact/role of the pharmacist and pharmacists' interventions	23
2. Pharmacoeconomics/outcomes research/quality of life as a function of various drug therapy regimens	12
3. Patient behavior/consumerism/behavioral aspects of care/improving patients' perceptions of the pharmacist	9
4. Pharmacy human resources/manpower/productivity	9
5. Health/drug policy–study of various models and resulting access and barriers to safe and cost-effective medicinal agents for patients	8
6. Educational research	7
7. Patient compliance/noncompliance with drug therapy (e.g., assessing, identifying models to improve compliance)	7
8. Drug distribution errors	6
9. Impact of PBMs/managed care on the profession of pharmacy and outcomes of patients	4
10. Technology/automation/computerization (identification of appropriate technologies, assessing effectiveness)	4
11. Direct-to-consumer advertising (effect on drug utilization and communication channels)	3
12. Disease management programs (usefulness, effect on access)	3
13. Drug pricing/marketing	3
14. E-commerce	2
15 Evaluating pharmacists' skills	2
16. Identifying and implementation of alternate models of pharmaceutical care delivery	2
17. Pharmacists' professional liability (research in legal affairs)	2
18. Pharmacogenomics (economic impact)	2
19. Reimbursement for cognitive services (improve likelihood of)	2
20. Service marketing/delivery of pharmaceutical services	2
21. Therapeutic markers/indices/benchmarking	2
22. Other (6)	
Complementary/alternative medicine	1
Consumer fraud regarding drug products	1
Medicare prescription drug benefit (effects of)	1
Practice environments	1
Professional organizations	1
Systems approach to morbidity	1
Teaching Issues/Concepts (n = 29)	
1. Management	28
General management concepts/business planning	11
Human resources management	9
Financial management	8
2. Communication/patient counseling	15
3. Health care systems/managed care	14

TABLE 8 (continued)

4.	Pharmacoeconomics/outcomes research/quality of life (general principles of)	14
5.	General marketing concepts	12
6.	Behavioral pharmacy/patient drug-taking behaviors	10
7.	Law/ethics	10
8.	Health policy analysis	9
9.	Drug literature evaluation/statistics/research methods and designs	8
10.	Pharmacoepidemiology	7
11.	Leadership/entrepreneurism/organizational skills	5
12.	Disease state management	3
13.	Pharmacists' professional roles	2
14.	Public health	2
15.	Other	
	Internet pharmacy/e-commerce	1
	Pharmacogenomics	1
	Quality assurance	1

schools of pharmacy have transitioned from the B.S. to the Pharm.D. as the sole entry-level degree. Recently, it has been shown that new faculty in high-consensus fields hold advantages in their acclimation to the prevailing role expectations (regardless of whether the primary role is teaching or research) of their employing institution over their low-consensus discipline colleagues (39). Thus, it is particularly important among pharmacy educators that consensus within each subdiscipline be attained and that progress be made by each of them toward achieving a scientific paradigm. It is also important that, for the purposes of interdisciplinary collaboration on teaching and research efforts, scholars of these subdisciplines have an understanding and a healthy respect for their counterparts' goals and priorities for educating future practitioners and advancing the profession. This study was conceived to compare rankings of pharmacy educators' perceptions of five pharmacy academic subdisciplines' progress toward achieving their scientific paradigms and to elucidate each of these subdisciplines' teaching and research priorities.

As evidenced from the data in Table 2, respondents from each subdiscipline perceived a greater level of consensus on what constitutes good teaching and scholarship within their own departments compared to other pharmacy departments at their respective institutions. While these responses may appear to be biased or overly optimistic, it bodes well for each subdiscipline that its respective scholars perceive agreement on these issues. The majority of respondents indicated that the

content in their department's course offerings differed "very little" to "somewhat" from those of other departments in the U.S. This may be due specifically to educational meetings, conferences, and journals commonly read by academicians from all five subdisciplines as well as networking opportunities afforded by membership in such organizations as the AACP and accreditation standards enforced by the American Council on Pharmaceutical Education (ACPE). Less directly, it may also be indicative of a culture of sharing and collaboration between scholars at different institutions and evidence that consensus exists within each subdiscipline. Additionally, perceptions of the level of agreement and maximum chain length of courses did not differ by respondent demographics, save for respondents from teaching universities/schools perceiving less agreement on what constitutes good scholarship. Perhaps there are unresolved issues at these institutions on the differences between "scholarly teaching" and the "scholarship *of* teaching."

Evidence of consensus also exists within the responses provided by subjects to the open-ended questions. It would appear from these responses that scholars in these subdisciplines have identified a core set of issues that should be taught to ELDP students. They also appear to have focused rather specifically on a core set of interrelated constructs and problems that should be addressed to promote patient/societal welfare and advance their own fields. There are some outlying responses that were cited only once by subjects; however, this is to be expected. It may be healthy for a discipline to have a few members engaging in research outside of the typical boundaries established by peers because theirs may be frontier work that establishes future research agendas.

The rankings of the subdisciplines according to respondents' perceptions of their scientific progress suggests that pharmacy scholars perceive pharmacy practice and the SAdS to be lagging behind the other three subdisciplines studied. This was largely true even among pharmacy practice and SAdS respondents themselves. While it is true that these fields are newer and tend to borrow or apply from "softer" sciences, it would appear from their responses to the quantitative questions from this study that these two subdisciplines are making progress in advancing their paradigms as well. It may be that within a professional discipline such as pharmacy the "hard-soft" gap between the physical and social sciences may be less disparate.

Still, recent evidence suggests that pharmacy practice may be lagging slightly behind other pharmacy disciplines studied in its consensus toward research methods and a research agenda (25). In this study, a

lesser proportion of pharmacy practice respondents answered the qualitative questions on research priorities than respondents from other disciplines. Furthermore, whereas the top research priorities were typically selected more than 20 times by members of other disciplines, no one research issue/agenda was selected even 10 times by pharmacy practice respondents. Without a more focused research agenda, it may be difficult for pharmacy practice scholars to acquire extramural funding and to publish their scholarly works. SAdS members' responses for research and teaching priorities were somewhat less congruent than those of medicinal chemistry, pharmaceutics, and pharmacology respondents. In that regard, the latter disciplines may be somewhat more mature. Future research should investigate journal rejection rates and identify factors that lead to successful scholarship for pharmacy practice and social and administrative scientists.

There is no evidence from this study to suggest a lack of respect for the SAdS and pharmacy practice subdisciplines or for their respective scholars. It would appear, however, that their members should take note of their own disciplines' progress and exert some effort to educate members of other pharmacy subdisciplines about the valuable research contributions they make. One way to accomplish this would be to extend offers to conduct interdisciplinary research projects with colleagues.

It also appears from the qualitative component of this study that there exists a significant potential for interdisciplinary collaboration among pharmacy scholars. Several issues were mentioned by more than one and, in some cases, all five subdisciplines' responses as research priorities. Genomics or pharmacogenomics was cited as a research priority by at least one respondent from each subdiscipline except for pharmacy practice. The opportunity exists, therefore, to concomitantly examine related issues in drug synthesis, drug design, appropriate delivery, and clinical and economic outcomes of pharmacogenomic products. Additionally, respondents from all five subdisciplines mentioned educational research to foster student learning and to enhance critical thinking skills as a priority. Other research agendas garnering attention from more than one subdiscipline were issues dealing with alternative or complementary medicine, the use of peptides in drug design and delivery, managing or mitigating adverse drug reactions, patient counseling, roles of the pharmacist and pharmacist interventions in modern health care, and seeking reimbursement for pharmacists' cognitive services.

CONCLUSIONS

If the pharmacy profession is to continue as an integral part of the modern health care delivery system, pharmacy academe must continue to strive toward consensus among its scholars. The results of this study suggest that five of pharmacy's academic subdisciplines perceive a considerable amount of accord on what constitutes effective teaching and scholarship. There was a considerable amount of consensus by scholars within each subdiscipline on the core concepts that each discipline is responsible for teaching to ELDP students. Moreover, there appeared to be a body of focused and interrelated issues that scholars from each subdiscipline perceive to warrant empirical investigation. It was also observed that there are issues that lend themselves well to interdisciplinary collaboration among pharmacy researchers. Rankings of perceptions of each subdiscipline's progress indicate that scholars in pharmacy practice and the social and administrative sciences may need to better promote their research agendas and findings to members of other pharmacy disciplines.

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APPENDIX–Survey Questionnaire

Part One A. First we would like to solicit your opinion about the **level of agreement** you perceive on various issues **within your academic department/discipline** at your institution. For the purpose of this study, academic departments are defined as: *(1) medicinal chemistry/pharmaceutical chemistry/pharmacognosy, (2) pharmaceutics, (3) pharmacology/toxicology, (4) pharmacy administration, and (5) pharmacy practice***.** Please indicate your response by circling the number that best describes your perception of intradepartmental agreement on a scale from **−2 = Considerable disagreement to +2 = Near perfect agreement**

	Considerable Disagreement				Near Perfect Agreement
1. How to sequence your department's course offerings for the entry-level degree program (ELDP).	−2	−1	0	+1	+2
2. What basic concepts to teach in your department's course offerings for the ELDP.	−2	−1	0	+1	+2
3. The most effective teaching methods and strategies that facilitate learning among students in the ELDP.	−2	−1	0	+1	+2
4. The quantity of outside work assignments given to students in the ELDP by members of your department.	−2	−1	0	+1	+2
5. The standards required for successful completion of your department's course offerings.	−2	−1	0	+1	+2
6. Standards for excellence in scholarship in your department.	−2	−1	0	+1	+2
7. The most reputable journals in which to publish in your discipline.	−2	−1	0	+1	+2
8. Methods of recognition and reward for excellence in scholarship in your department.	−2	−1	0	+1	+2
9. Requirements for tenure and promotion in your department.	−2	−1	0	+1	+2
10. The qualities to look for in hiring a new faculty member in your department.	−2	−1	0	+1	+2
11. Departmental decision making as governance (how decisions are made, level of input by department faculty, etc.)	−2	−1	0	+1	+2

****If your department offers a graduate degree (M.S. or Ph.D.), please complete Part One B, a continuation of Part One A. If not, skip to Part Two.****

Part One B.

12. The requirements for successful completion of graduate degrees.	−2	−1	0	+1	+2
13. The roles of graduate students as teaching assistants.	−2	−1	0	+1	+2
14. The roles of graduate students as research assistants.	−2	−1	0	+1	+2
15. The nature of graduate student stipends (amount of stipend, limits on the length of time students may receive stipends, etc.).	−2	−1	0	+1	+2
16. Teaching methods and strategies in graduate courses.	−2	−1	0	+1	+2

Part Two. Please answer the following questions by circling your answers.

17. How do you perceive the level of agreement in your department compared to other pharmacy departments at your institution?

a. Agreement on teaching (what to teach, what is considered "good" teaching)

Much less Somewhat less About the same Somewhat more Much more

b. Agreement on scholarship (what and how much qualifies as "good" scholarship)

Much less Somewhat less About the same Somewhat more Much more

18. How much does the content in your department's ELDP course offerings differ from those of other schools of pharmacy?

Very much Somewhat Very little Not at all

Part Three. Please answer the following questions.

19. What is the maximum chain length of courses for the ELDP offered by your department; that is, the number of courses strung together by prerequisites. In other words, if there are no courses that are dependent upon material in preceding courses, the maximum chain length would be "One." Even if your department offers several required courses that are all important to students, if they are not prerequisites for one another the answer would still be "One."

_____ courses

20. There exists a concept called ***scientific paradigm***, which includes accepted theory and findings of a field or discipline, preferred methodologies, important areas to study, and concepts to teach. Please **rank** the five disciplines below according to how well structured you believe their paradigms are. Place a "1" next to the discipline you believe has the most structured paradigm, a "2" by the 2nd most, and so on. Please **rank all five** to the best of your abilities.

_____ Medicinal chemistry/pharmaceutical chemistry/pharmacognosy
_____ Pharmaceutics
_____ Pharmacology/toxicology
_____ Pharmacy administration
_____ Pharmacy practice

APPENDIX (continued)

21. Please list the top six concepts/issues (not necessarily in order) that you think should be researched in your discipline. Think in terms of both promoting patient/societal welfare and advancing your scientific discipline when identifying these issues. Avoid being too broad or too specific. For example "community pharmacy management," "asthma therapy" or "elucidate the mechanisms of action of all pharmaceuticals" or "structure-activity relationships" would be overly broad, however "social support as a buffer to perceptions of powerlessness in community pharmacists" or "low-dose beclomethasone for treating adolescents with asthma" or "the role of TRK in NGF-stimulated SH-SY5Y neuroblastoma cells in culture" is too specific.

a.

b.

c.

d.

e.

f.

22. Please list the top six concepts/issues (not necessarily in order) that you think should be taught in the ELDP by members of your discipline. Apply the same criteria described above in Question #21.

a.

b.

c.

d.

e.

f.

Part Four. Finally, please tell us just a little bit about yourself and your work environment.

23. To which discipline are you a member? (please check √ one)
____ Med chem/pharm chem/p'cognosy ____ Pharmaceutics ____ Pharmacology/toxicology ____ Pharmacy administration ____ Pharmacy practice

24. How would you classify your institution? (please check √ one)
____ Primarily teaching ____ Primarily research ____ Balance of teaching/research

25. What is your current rank?
____ Instructor ____ Assistant Prof. ____ Associate Prof. ____ Professor

26. How many years have you been at that rank? _____ Years

27. How many years have you been employed as a full-time faculty member?
_____ Years

28. Your age? _____ Years

29. Your gender? _____ Male _____ Female

30. Your race/ethnicity? _____ Caucasian/White _____ African-American/Black
_____ Hispanic/Latino _____ Asian/Pacific Islander
_____ Native of India _____ Other